

## **The Relationship between Academic Ability, Locus of Control and Reward Contingency**

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### **Abstract**

Rewards have been viewed as a crucial factor in learning process proposed by behavioural theorists from the early twentieth century to the mid-1960s. Some contemporary researchers have disputed that rewards could produce “learned helplessness” or “overjustification effect”; others mentioned that individuals performed worse when they were attempted with incentives. The author proposed that individuals, performance depended on their characteristics and the nature of reward conditions. A rationale was provided in the present literature review for conducting further experiments on the effect of locus of control and reward contingency on students academic performance.

Keywords: Academic Ability, Locus of Control, Reward

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## INTRODUCTION

Reward has been viewed as a crucial factor in the learning process proposed by behavioural theorists, such as Thorndike's "law of effect" (Thorndike, 1913) and Skinner's "principles of operant conditioning" (Skinner, 1953) from the early twentieth century to the mid-1960s. Contemporary studies of learning, however, have modified this perspective over the last thirty years. Concerns about the effect of non-contingent rewards on "learned helplessness" began to emerge when researchers started to suspect that a person could become helpless as a result of exposure to uncontrollable outcomes, such as non-contingent rewards (Seligman, 1975). Similarly, some theorists argued that extrinsic rewards that are made contingent on performance may undermine intrinsic interest of children who are already intrinsically motivated (Deci, 1971), or produce an undesirable consequence in the absence of rewards after being rewarded for their performance in terms of "overjustification effect" (Lepper, Greene & Nisbett, 1973). Overjustification effect, according to Lepper, et al. (1973), refers to the observation that individuals, who initially engaged an activity such as a puzzle or game for no reward, became less likely to perform that activity for no reward after being given tangible rewards for their performance.

Later developments in our understanding of underlying principles of operant learning became more integrated with studies of cognitive processes. For instance, "Cognitive Evaluation Theory" (Deci, 1975; Deci & Ryan, 1985) suggested that rewards may facilitate or hinder the sense of competence and self-determination depending on an individual's perception of whether rewards are informational (as signifying competence), controlling (as pressure toward outcomes) or amotivating (as being independent of behaviour, thus undermining motivation). In addition, Rotter's "Social Learning Theory Locus of control Construct" suggested that generalising the "law of learning" is a problematic procedure because the effect of rewards depends on how the person perceives a causal relationship between his or her behaviour and the reward (Rotter, 1966). If the person perceives a reward as contingent upon his or her own effort or ability (internal locus of control); then the occurrence of a reward will strengthen the likelihood of that behaviour recurring. If he or she sees a reward as not contingent upon ability or effort, that is, as a result of luck, chance, fate, or powers beyond personal control (external locus of control); then the preceding behaviour is less likely to be strengthened by the presence of a reward. Essentially, Rotter (1966) further proposed that individuals who have a strong belief that they can control their own destiny (with an internal locus of control), are likely to place greater value on achievement reinforcement than those with an external locus of control. In the light of

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Rotter's proposition, research revealed that there is an interaction between differential locus of control and the efficacy of contingent versus non-contingent rewards (Charlton & Terrell, 1987; Kennelly & Mount, 1985; Kramer & Rosellini, 1984; Kren, 1992; Trusty & Macan, 1995) but the findings are not altogether. One possible reason for the inconsistency may be differential academic ability.

### **THE PURPOSE AND THE METHOD OF THE PRESENT LITERATURE REVIEW**

#### **The Purpose**

The purpose of this literature review attempts to document a selection of relevant research on the use of rewards in relation to academic achievement. The review of the present literature aims to investigate a potential interaction effect of academic ability, locus of control and reward contingency on academic achievement.

#### **The Method**

The procedure of the present literature review consists of literature searching, synthesizing/analysing, and establishing the significance of a problem (Tuckman, 1994).

The literature search involves choosing keywords and key areas, searching for relevant titles and abstracts and locating important primary source documents. The list of journal articles, dissertations, unpublished reports and books selected in the present literature review is mainly from the computerized version of the Educational Resources Information Center (ERIC) and PsycLIT.

The analysis of the literature is a process of synthesizing the past work in the field and bringing it up to date. The articles relevant to the topic are organized by content, and the findings are illustrated, compared and critiqued in the present review. The prior relationships between variables in the related area are explored, scrutinized and reviewed in order to build a case for a subsequent investigation that has potential merit (Tuckman, 1994).

The establishment of the significance of a problem is enhanced by a theoretical and applied justification. The conclusions are made for the purpose of enabling others to see significant gaps and to give a field direction for further research (Tuckman, 1994).

## THE REVIEW OF THE LITERATURE

The present literature review begins with an introduction to the principles of operant conditioning, and then continues with an investigation of the theoretical explanations related to operant learning problems. This is followed by an introduction to research on locus of control. The review then proceeds to establish the context for an investigation of the relationship between locus of control, the level of academic ability and academic achievement. The interaction of differential locus of control with contingent versus non-contingent reward is then explored. An examination of the relationship between academic ability and reward contingency then follows. Finally, a rationale is provided for conducting further research on the effect of locus of control and reward contingency on the academic performance of high and average academic ability students.

## OPERANT CONDITIONING

Behavioural theorists, such as Thorndike (1905), described a relationship between people's environment and their behaviour. The "law of effect", formulated by Thorndike, suggested that if a response is followed by a gratifying event, the association between the stimulus and the response is strengthened. If it is followed by an irritating event, the association is weakened. A reinforcer basically functions to strengthen the desirable response and is, therefore, essential for learning.

Furthermore, Skinner's radical behaviourism (Skinner, 1974) indicated that human behaviour is determined by the relationship between a response and the consequence of that response, that is, a reward contingency (Klein & Mowrer, 1989). Skinner suggested that in order to understand human behaviour, researchers must study an individual's behaviour in response to his or her environment, rather than attempting to access the person's internal state and disposition. Skinner believed that most human behaviour can be ultimately explained in terms of the principles of operant conditioning (Carlson, 1993).

Operant conditioning (also called instrumental conditioning) refers to "increasing or decreasing the frequency of a response through contingent reward or punishment" (Carlson, 1993, p.629). Through the manipulation of reward contingencies, that is reward, no-reward or punishment, behaviour changes in an individual may occur. According to the principles of operant conditioning, the necessary condition for the strength of stimulus-response relationship is reward. Without manipulating reward, non-reward, punishment, or non-punishment, learning does not occur (Deci, 1975).

### **The Distinction between Reinforcement and Reward**

A 'reinforcer' is a stimulus that can be shown to strengthen a response. There are two major kinds of reinforcers: positive and negative. Providing something of positive value (i.e. appetitive stimulus) following behaviour (a response) is positive 'reinforcement', removing something of negative value (i.e. aversive stimulus) following behaviour (a response) is negative reinforcement. A reinforcer, whether positive or negative, is a stimulus that always strengthens or increases the occurrence of a response associated with it (Carlson, 1993).

A 'reward' is an outcome or event that is perceived by the organism as enjoyable and thus may act as a positive reinforcer, such as social rewards (praise, attention, encouragement) or tangible rewards (grades, stickers, candies, food, toys, money). However, it can not be assumed that rewards, such as grades, praise and money will always act as they are supposed to -namely increasing performance. Only an effective reward can serve as a positive reinforcer of the behaviour (Gage & Berliner, 1992).

### **Categories of Rewards**

Ryan, Mims and Koestner (1983) categorised rewards in terms of task-non-contingent, task-contingent, performance-contingent, and competitively contingent rewards. Task-non-contingent rewards are delivered to people who simply participate. Task-contingent rewards are given to people who actually complete the task. On the other hand, performance-contingent rewards are presented only to people who reach predetermined performance criteria, while competitively contingent rewards are given to those who compete with others for a limited number of rewards and win.

Generally speaking, Ryan, et al.'s categories of rewards are widely recognised as one of the most popular models. Nevertheless, within this model the random non-contingent reward, referring to a reward that is randomly delivered (by chance) has been omitted. While task-non-contingent rewards are given to all of the subjects who just participate in a session, random-non-contingent rewards are delivered randomly (by chance) to some subjects but not the others in one session. Within the classroom, however, both types of non-contingent rewards are relatively common. For example, some teachers may give each student a sticker at the end of a semester, while others may give stickers to a number of students randomly each week regardless of how they perform.

In the past several decades, the effectiveness of different types of rewards with different samples of subjects in educational settings has been widely investigated in a large number of applied studies which will be selectively illustrated below.

### **Applied Research on the Effectiveness of Reward Contingency**

One of the specific fields where the use of rewards has been extremely relevant is the school classroom setting. Common educational practices often involve the use of rewards, such as verbal rewards (praise) and tangible rewards (stickers, certificates, stationery prizes, vouchers and so on). In recent years there has been an enormous amount of research on the effects of rewards, and the relationship between teacher's praise and students' satisfaction with their classroom. There is a widening concern about the manner of using rewards.

For example, Worland (1998) found that students who received praise/encouragement based on their performance improved more than did students who received no praise/encouragement. However, students who received encouragement in the absence of praise reported lower levels of course satisfaction. Meanwhile, Hitz and Driscoll (1994) argued that praise alone did not enhance children's self-esteem. They suggested that teachers should provide specific encouragement for students' efforts. Similarly, Carns and Carns (1998) suggested that encouragement, rather than extrinsic reward, promoted the healthier self-concepts and better behaviour in children. Additionally, Swan (1997) in an interview with educator-author Alfie Kohn recommended the need to abandon praise as a form of control (that is, situations where students were controlled and enticed with money or grade). This viewpoint was echoed by McVey (2001) who cautioned teachers to avoid controlling effects of praise, such as manipulating students with incentives.

In terms of different types of praise, Kamins and Dweck (1999) examined the effects of person praise (such as "You are a good girl"), outcome praise (i.e., "That's the right way to do it") and process praise (such as, "You must have tried really hard") on children's performance rating, affect, self-assessments and persistence when subsequent setbacks were encountered. The results showed that person-praise was more likely than outcome-praise/process-praise to produce a helpless reaction when children confronted subsequent setbacks. The reason for this is that person-praise tends to lead to judgments of self-worth on the basis of a small number of examples. Thus, students in a person-directed feedback group are more likely to attribute their failure to lack of ability, and show helpless reactions after a subsequent failure. These results indicated that different types of praise could either create helpless patterns

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(person praise) or enhance the strivings (outcome praise and process praise).

With respect to the reward contingency, Seidler and Howie (1999) investigated the effect of reward contingency on first-grade and fourth-grade children's recall of a video they had seen. The results showed that the contingent reward group's overall accuracy was significantly higher than that of the non-contingent reward group, but there was no significant difference between two different age groups. Moreover, Hicken, Sullivan and Klein (1992) investigated the effects of the two types of rewards: task-contingent and performance-contingent on 111 undergraduates' achievement. The results showed that the performance-contingent group performed significantly better than task-contingent groups. However, there was no significant difference in investment of learning time.

Sharpley (1988) investigated the effects of verbal praise on children's performance at a digit-symbol coding task under three conditions: contingent reward (upon improvement over previous performance), non-contingent reward (upon completion of task) and control (no reward). The researcher suggested that there were significant reinforcing effects when the administration of vicarious reward followed the No Reward condition, but significant extinguishing effects when the vicarious rewards were preceded by the direct and contingent rewards. In addition, the results provided evidence that the same reward (verbal praise), delivered contingently, was a more powerful reward than no-reward but, delivered non-contingently, was not significantly more reinforcing than no-reward. Apart from that, research evidence suggested that prolonged exposure to noncontingency could be stressful and frustrating and these effects have been documented across the lifespan (Heckhausen & Schulz, 1995).

Not all of the research on this subject results in the same patterns and directions. For example, Klein and Higgins (1992) examined the effect of performance-contingent and participation-contingent rewards on learning a visual discrimination task. Subjects were 12 male and 74 female undergraduates. Interest in learning the task and was significantly associated with performance, while the types of reward contingency were not significantly related to performance. This may suggest that the effect of an individual's interest is stronger than that of the different types of rewards.

The interaction between individual differences and the effect of reward has been explored in other areas. For instance, Lucas (2001), Torrubia, Avila, Molto and

Caseras (2001), Lucas, Diener, Grob, Suh and Shao (2000) confirmed that the sensitivity to reward scale was positively related to Eysenck's Extraversion scale. In addition, Lee (1997) compared the effects of rewards on performing problem-solving tasks between impulsive groups and non-impulsive groups. By definition, impulsiveness is a temperamental factor classifiable as extraversion. Impulsiveness is characterized by "spontaneous direct action with little regard for the consequences" (Eysenck, Arnold & Meili, 1972, p. 110). The results indicated that subjects in the impulsive group were more likely to be activated by the availability of rewards compared to those in the non-impulsive group. The findings of positive relationship between the sensitivity to reward scale and the Eysenck's impulsiveness scale are also supported by Torrubia, et al. (2001).

Overall the results of these studies support the assumed interaction between individual personality differences and the efficacy of rewards.

## **DEBATES ASSOCIATED WITH OPERANT LEARNING PROBLEMS**

### **Learned Helplessness Theory: Non-contingent Reward Induces Learned Helplessness**

Behavioural theorists believe that the most that can be learned is a pairing of a response with the presence of a reward, or the absence of the reward (partial reinforcement). However, Seligman (1975) argues that when the probability of an outcome is the same (50% versus 50%) whether or not a given response occurs, the outcome is independent of that response. When an individual in a situation where an outcome appears to be independent of his or her responses, he or she may learn that his or her responses are ineffective and tend to believe that any responses he or she makes will be powerless to affect the outcome. When a person experiences such 'uncontrollability' of outcome, he or she may acquire learned helplessness.

Saylor, Finch, Cassel, Saylor and Penberthy (1984) examined the effectiveness of non-contingent positive reward and response cost compared to contingent positive reward (earned points for successful performance) and response cost (lost points for unsuccessful performance) on depressed and non-depressed subjects. The results showed that non-contingent positive reward and response cost induced learned helplessness in contrast to contingent positive reward and response cost. There was no difference between depressed and non-depressed subjects.

In addition, Lamb, Davis, Tramill and Kleinhammer-Tramill (1987) investigated



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the effect of non-contingent rewards on normal undergraduate students. The results showed that those subjects previously receiving 100% non-contingent reward and those receiving 50% random reward made significantly more errors than did the control and contingent-reward groups on the subsequent tasks. Furthermore, these deficits could be induced by the exposure to either verbal praise or concrete reward.

However, Matute (1994) argued that deficits following exposure to non-contingent outcomes resulted from the design with 'failure light feedback' rather than uncontrollability. Matute (1994) found that failure red light feedback was unpleasant to subjects and removing the feedback procedure eliminated interference and concluded that failure light feedback induced failure rather than learned helplessness, thus interferences resulting from the design with red-light feedback should not be taken as evidence supporting the learned helplessness theory.

In order to evaluate this claim, Hatfield and Job (1998) created a novel manipulation system designed to promote the notion of noncontingency in Matute's triadic no-feedback procedure induction (Matute, 1994). The outcomes showed that non-contingent subjects, whose tone terminations were direct-yoked but who did not receive the feedback procedure, did not show deficit. Learned helplessness was found in non-contingent subjects, whose tone terminations were random-yoked but who did not receive the feedback procedure. These results rejected Matute's conclusion that feedback induced deficit rather than learned helplessness. The review of applied research on learned helplessness has provided support for the idea that learned helplessness could be induced using non-contingent positive reward.

### **Cognitive Evaluation Theory and Overjustification Effect: Extrinsic Rewards May Undermine Intrinsic Motivation**

Behavioural learning theorists believe that rewards are important for learning. Cognitive theorists, on the other hand, argue that extrinsic rewards may affect people's thoughts about why they are working and may lead them to believe that they are working for rewards. This would consequently leave individuals less intrinsically motivated. In his classic experiment, Deci (1971) suggests that if monetary rewards are given to subjects for doing an intrinsically motivated activity, and if the rewards are performance-contingent, their intrinsic motivation for the activity may be reduced.

Soon after that research, Lepper, Greene, and Nisbett (1973) examined the effect of rewards on subsequent intrinsic interest. In this study, nursery school children were randomly assigned into three conditions: expected-reward, unexpected-reward and

no-reward conditions. The results showed that the subjects in the expected-reward played with magic markers less than did those in either the no-reward or unexpected-reward conditions during a 'free-play' period. Lepper et al. (1973) concluded that such 'Overjustification Effect' occurs when individuals who initially engaged an activity for no reward became less likely to perform that activity for no reward after being rewarded for their performance.

In 1985, Deci and Ryan (1985) further proposed a Cognitive Evaluation Theory that rewards may facilitate or hinder intrinsic motivation depending on an individual's perception toward outcome as informational, controlling or amotivating. Rewards which are seen as informational indicate skill in performing a task and lead to increased competence and intrinsic motivation. Rewards which are seen as controlling indicate external pressure and lead to decreased self-determination and intrinsic motivation. Rewards which are seen as amotivating indicate outcomes as being independent of behaviour and lead to decreased competence and intrinsic motivation.

The claim that extrinsic rewards negatively affect intrinsic motivation was supported by Kohn who condemned the use of rewards in education settings and business (Kohn, 1993a) and declared that "any incentive or pay-for-performance system tends to make people less enthusiastic about their work and therefore less likely to approach it with a commitment to excellence" (Kohn, 1993b, pp. 62-63).

On contrast, Tang and Hall (1995) conducted a meta-analysis and found that when task intrinsic interest was initially high, the reward was task contingent, expected and tangible with no additional feedback; the overjustification effect was quite consistent over the ages of subjects, research design and dependent measure. However, when initial interest was low, task contingent, tangible and expected reward, no significant overjustification effects were found. In addition, the results showed that neither informational nor controlling task feedback had any effect on intrinsic motivation. Moreover, Eisenberger, Pierce and Cameron (1999) in their meta-analysis indicated that (1) reward procedures requiring trivial performance decreased intrinsic motivation, while reward procedures requiring specific high performance increased intrinsic motivation, and (2) rewards for meeting unspecified performance standards (e.g. doing well) reduced intrinsic motivation, whereas rewards for meeting specified performance standards (e.g. solving a specified number of puzzles) did not reduce intrinsic motivation.

Lepper (1995) argued that meta-analytic procedures can not give appropriate

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weight to theoretically important findings in individual studies. In response to the argument over meta-analysis, Carton and Nowicki (1998) conducted field studies to re-examine empirically the undermining effect of reward on intrinsic motivation including baseline data and no-reward control group. They found that stimulus (the verbal instructions informing lack of reward) control is the crucial variable rather than controlling or amotivating aspects of reward. Therapists or educators need pay close attention to the stimuli associated with reward delivery for promoting the effectiveness of treatments. Therefore extrinsic reward should not be discarded, but rather be used in a careful way.

The above claim is further supported by Flora and Flora (1999) who examined the effects of extrinsic rewards for reading during childhood on reported reading habits of college students. The results showed that when a child was extrinsically reinforced for reading the child would increase the amount of reading, enjoyed reading more, and if they didn't know how to read, the programs might help the child learn to read. They suggested that "extrinsic rewards for reading set the conditions where intrinsic motivation for reading may develop" (Flora & Flora, 1999, p. 11).

Ryan and Deci (2000) recently revisited the classic definitions of intrinsic and extrinsic motivation taking present-day research and findings into consideration. They clarified that "intrinsic motivation will occur only for activities that hold intrinsic interest for an individual – those that have the appeal of novelty, challenge, or aesthetic value for that individual. For activities that do not hold such appeal, the principles of Cognitive Evaluation Theory (CET) do not apply" (Ryan & Deci, 2000, pp.59-60). They conceded that extrinsically motivated activities can become self-determined through the developmental processes of internalization (taking in a value) and integration (attaining one's sense of self).

A further issue is how to enhance the effects of extrinsic rewards. It seems logical to argue that students are less extrinsically motivated when they do not get rewards than when they do. It is of the essence to further investigate the mediating factors that may influence the outcomes of reward.

### **Social Learning Theory 'Locus of Control Construct': The Effect of Rewards Depends on the Individual's Perception of Causal Relationship.**

Apart from the two major debates associated with operant learning problems revealed above, social learning theorists have also criticised the principles of operant conditioning in terms of differential locus of control. According to the social learning

perspective, contingent experiences create expectations rather than stimulus-responses connections. Bandura (1977) argued that humans do not simply respond to stimuli; they interpret them. Stimuli influence the likelihood of a particular behaviour occurring through individuals' predictive functions, not only through their automatic responses (Sheldon, 1982).

Similarly, Rotter (1966) proposed that the effects of reward are dependent in part on whether individuals perceive the reward as contingent on their own behaviour or independent of it. A valued reward does not always result in an increase in the frequency of the behaviour. Behaviour is determined by the perceived value of the reward and the degree to which the individuals believe the reward is dependent upon their own actions. According to Rotter (1966), if individuals perceive the reward as contingent upon their own behaviour or characteristics, we have termed this a belief in internal control. When a reward is perceived by individuals as the result of luck, chance, fate, as under the control of powerful others, we label this a belief in external control. This perception can vary in degree.

A general hypothesis from Rotter's locus of control theory is that if a person perceives a reward as contingent upon his or her own behaviour, then the occurrence of a reward will strengthen the likelihood of that behaviour recurring. If he or she sees reward as not contingent, then the preceding behaviour is less likely to be strengthened by the presence of a reward. Rotter (1966) further indicated that individuals who have a strong belief that they can control their own destiny, that is, with an internal locus of control, are likely to place greater value on achievement rewards. Rotter argued that generalising the "law of learning" is a problematic procedure because the effect of a reward depends upon whether or not the person perceives a causal relationship between his and her behaviour and the reward. Internals tend to be more aware than externals of the relationship between their own efforts and the subsequent outcomes; therefore, internals are more likely to work harder than externals under performance-contingent reward conditions. In other words, Rotter's Locus of Control theory (Rotter, 1966) suggested that the efficacy of rewards may be mediated by the individual's socio-cognitive processes.

### **Differences between Rotter's Locus of Control Theory and Weiner's Attribution Theory**

Rotter's Locus of Control theory focuses on people's generalized beliefs or expectations about what causes them to receive or not receive rewards. According to Rotter, an individual who generally believes that outcomes are contingent upon his or

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her own effort or ability, has an internal locus of control; a person who believes that outcomes are caused by factors beyond personal control (e.g. by luck, chance, fate or powerful others) has an external locus of control (Stipek, 2002).

Weiner (1986) argued that although effort and ability are both internal, they have different behavioural implications. For example, effort is seen as controllable, whereas ability is seen as uncontrollable. In addition, ability is a relatively stable cause, whereas effort varies from situation to situation. Therefore, Weiner has expanded Rotter's single internal-external locus of control dimension into three separate dimensions: internality/externality, stability/instability and controllability/uncontrollability (Stipek, 2002). According to Weiner, among four main causal attributions of successes and failures, ability is internal, stable and uncontrollable; effort is internal, unstable and controllable; whereas task difficulty is external, stable and controllable; luck is external, unstable and uncontrollable.

Weiner emphasized that situation-specific attributions can be evaluated by providing a set of options. For example, "why did you do poorly on your spelling test?" The options of answers could be "I did not study much", "I did not study the right things", "I am not smart", "The teacher did not explain things well", "I were not helped by anyone", and "The work was hard". According to Weiner's attribution theory, students who attribute past failure to low effort are likely to anticipate success in the future. Those who attribute past failure to low ability are not likely to put forth effort on future tasks (Stipek, 1998).

A primary difference between Locus of control theory and Attribution theory is that Locus of Control theorists study people's expectations related to future events, whereas Attribution theorists study perceptions of the cause of achievement-related events that occurred in the past (Stipek, 2002). Unlike Rotter's Locus of Control theory in which locus of control is evaluated before the occurrence of an outcome, Weiner's Attribution Theory is concerned with causal explanations of past events, in which attributions are evaluated after the occurrence of an outcome (Elliott, 1997).

### **Differences between Rotter's Locus of Control Theory and Harter's Intrinsic versus Extrinsic Motivational Orientation**

Harter (1981) proposed a new self-report scale that measures a child's intrinsic versus extrinsic orientation toward learning and mastery in the classroom. Five separate dimensions are defined by an intrinsic and an extrinsic pole: preference for challenge versus preference for easy work, curiosity/interest versus teacher approval,

independent mastery attempts versus dependence on the teacher, independent judgment versus reliance on the teachers' judgment, an internal versus external criteria for success/failure. Sample items from Harter's Intrinsic Motivation Scale are: "Some kids like to go on to new work that's at a more difficult level", "Some kids do extra projects so they can get better grades", "When some kids get stuck on a problem they ask the teacher for help", "Some kids think the teacher should decide what work to do" and "Some kids know whether or not they're doing well in school without grades". Students are asked to select one answer from two options "really true for me" or "sort of true for me" for each question (Harter, 1981).

Unlike the social learning theory of Locus of Control construct which focuses on general expectation of reinforcement, the first three dimensions of the motivational orientation scale are more motivational in nature; the last two are more cognitive-informational in nature. An individual with a high score on these subscales is intrinsically motivated to engage in the mastery process. According to Harter (1981), the intrinsically oriented individual reports a greater knowledge of what factors control the successes and failures in his or her life, and tends to report that the source of control is internal.

#### **ANTECEDENTS OF INDIVIDUAL DIFFERENCES IN LOCUS OF CONTROL OF REINFORCEMENT**

Rotter (1966) suggests that one antecedent of internal-external attitudes would be the consistency of discipline and treatment by parents. Carton and Nowicki (1994) reviewed literature related to the origins of individual differences in locus of control and concluded that contingent parental behaviours, parental control (versus encouraging autonomy), stressful life events and parental warmth (versus rejection) were four crucial variables in the development of differential locus of control.

In their further investigation with the use of survey and observational methodologies, Carton and Nowicki (1996) found that internal children had experienced less stress in their lives, and mothers of internal children were rated as displaying less control and more warmth than mothers of external children when the interaction of 51 children and their mothers was video-typed and observed.

McLaughlin and Saccuzzo (1997) found that Caucasian children had a more internal locus of control than other ethnic groups, such as Latino, Hispanic, African-American and Filipino. In addition, children with two or more vulnerability

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factors had a significantly more external locus of control than children with none or only one vulnerability factor. The findings related to the 'at risk' factor are supported by some reports (Lau & Leung, 1992; Levin, 1992; Nunn & Parish, 1992; Payne & Payne, 1989) but not the others (Elliott, 1996). Moreover, McLaughlin and Saccuzzo (1997) suggested that gifted students were more likely to have internal locus of control which is consistent with the findings of Pufal-Struzik (1998). Apart from that, McLaughlin and Saccuzzo (1997) suggested that females showed a slight but significantly greater internal locus of control which is supported by Manger and Eikeland (2000) who found that girls had significantly higher total internal locus of control scores than boys. In contrast to these findings in relation to gender, Karnes and McGinnis (1996) found no significant difference in gender, but the older students tended to have a more internal locus of control.

In an earlier study, Levenson (1972) suggested inconsistent results appeared in research using the I-E scale due to the broad definition of externals. Levenson (1973) argued that the I-E scale should not be unidimensional. Individuals who view the world as unordered (chance) behave differently from those who believe the world is ordered by powerful others. Therefore the author constructed new three-dimensional scales- Internal, Powerful Others, and Chance (IPC) to differentiate between two classes of externals. Krampen and Wieberg (1981) suggested that more differentiated data can be obtained with three-dimensional IPC scales in terms of gender and culture differences.

The literature suggests that age, giftedness, and child rearing environment, such as the parental warmth and life vulnerability events may be associated with internality. In addition, the inconsistency in internality and externality research outcomes in gender and culture may be result of different instruments used in term of uni-dimensional or three-dimensional.

## **THE RELATIONSHIP BETWEEN LOCUS OF CONTROL AND ACADEMIC ACHIEVEMENT**

As Rotter (1966) proposed earlier, locus of control may play a mediating role in the operant learning process. A number of studies have explored the relationship between locus of control and academic achievement. The research findings of the relationship between locus of control and academic achievement are sometimes contradictory.

For example, Boatwright (2002) investigated the effects of locus of control on the academic achievement of 200 fourth-grade students from four elementary schools and found that there was a significantly positive relationship between internal locus of control and high levels of the fourth-grade reading and mathematics achievement. These findings are consistent with those of Day (1999) and Smith (2002). Moreover, Ross and Broh (2000) examined the effects of academic achievement on sense of personal control. In total 24,599 eighth-grade students completed locus of control questionnaires at baseline and at 2- and 4-year follow-ups. Results revealed that academic achievement in the eighth grade was related to an internal locus of control in the tenth grade, which, in turn, was associated with academic achievement in the twelfth grade.

In contrast, Mwamwenda (1995) and Smith, Sapp, Farrell and Johnson (1998) examined the relationship between locus of control scores and academic achievement and found a lack of significant difference between internal and external students in academic achievement. The possible reason for the inconsistency of these two studies with previous research may be attributed to the different ages of the subjects or a biased sample. For example, Mwamwenda's subjects were African adults with mean ages of 36.5 year for women and 35.0 year for men (Mwamwenda, 1995). Additionally, Smith, et al.'s subjects were from a private Catholic high school and may therefore be more likely to be academically oriented than those from normal public schools ( Smith, et al.,1998).

Kalechstein and Nowicki (1997) completed a meta-analytic review of the relationship between locus of control and academic achievement for studies published between 1983 and 1994. The purpose of the investigation was to replicate the results from a meta-analysis conducted by Findley and Cooper (1983). Basically, the results of the two meta-analytic reviews are consistent. First, both reviews suggested that internality and academic achievement were positively related. Secondly, both studies found the correlation among adolescents was stronger than among children or young adults. Thirdly, race was not significantly correlated. However, Kalechstein and Nowicki's findings contrast with those of Findley and Cooper (1983) in two ways. Kalechstein and Nowicki (1997) suggested that the relationship between locus of control and academic achievement was not moderated by gender or the type of dependent measure used, whereas Findley and Cooper (1983) suggested that the relationship between locus of control and academic achievement was stronger for males than for females, and specific locus of control measures (for example, Intellectual Achievement Responsibility Scale) predicted more accurately than



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generalised locus of control measures (for example, Nowicki-Strickland Locus of Control Scale for Children).

Because an internal locus of control has been shown to be a correlate of school success, in the recent years, a number of intervention programs have been focused on increasing students' perceptions of internal locus of control. For example, Fielding (2002) created an intervention program 'Strong girls, strong selves' which was aimed to promote self-esteem, feelings of strength, self-worth and internalization of locus of control in pre-middle school girls. The results indicated that students in the treatment group had greater changes in decreasing external locus of control than those in the control group. Apart from these positive outcomes, the effectiveness of participation in intervention program on the self-concept and locus of control has also been confirmed in similar lines of studies (Dupper, 1998; Eckman, 1996; Freedman, 1996; Hughes, 2003; Nunn, 1995; Watt, 1999).

### **THE INTERACTION BETWEEN ACADEMIC ABILITY AND LOCUS OF CONTROL ON ACADEMIC ACHIEVEMENT**

Academic ability is defined on the basis of multiple criteria identification including aptitude, achievement and teacher nomination information. Academic ability is generally identified as a significant predictor for academic achievement. Many researchers indicate that just as we would expect students with higher I.Q. scores to achieve higher academically than their lower scoring classmates, there is evidence supporting the expectation that students with an internal locus of control perform better than their classmates with an external locus of control. For example, Creek, McDonald and Ganley (1991) found that a group of the fourth, fifth and sixth-grade non-gifted internals with a mean I.Q. of 120 achieved the same test results in reading and mathematics as the gifted externals with a mean I.Q. of 140. It seems that internal locus of control may counteract to some degree for the lack of academic ability in terms of academic achievement. Although the relatively high mean IQ of both of the groups compared in Creek, et al.'s research suggests that both groups could include students that would be identified as gifted, rather than gifted versus non-gifted, the results lend support for the suggestion that there may be an interaction between academic ability and differential locus of control on academic achievement (Creek, et al., 1991).

Additionally, Knight (1995) suggested gifted achievers tended to have an internal locus of control, while underachieving gifted students tended to have more external

locus of control. Moreover, Laffoon, Jenkins-Friedman and Tollefson (1989) compared the mean locus of control of third, fourth and fifth-grade underachieving gifted, achieving gifted and non-gifted students and found that underachieving gifted and non-gifted students were more external than their achieving gifted peers. Again, these findings are consistent with those of Van Boxtel and Monks (1992) who examined four groups of subjects: many-sided gifted achievers, one-sided academically gifted achievers, gifted underachievers and average ability/achievement group. The results suggested that gifted underachievers (age from 12 to 15 years) tended to have more external locus of control than the control group (average in academic ability and academic achievement).

These results provide evidence that there is an interaction of academic ability and differential locus of control on academic performance. However while this evidence suggests that there may be a positive relationship between internal locus of control, high IQ and academic achievement, the research findings have not been consistent.

McClelland, Yewchuk and Mulcahy (1991), for example, found no support for a relationship between locus of control, giftedness and academic achievement. In this study the authors examined locus of control in underachieving and achieving gifted Grade 6, 7, 8 and 9 students. The results showed that general locus of control measures did not differ between gifted underachievers and gifted achievers. We may argue that without an average ability control group, it is difficult to conclude the relationship between academic ability, achievement and locus of control. This result needs to be replicated with a control group included.

In contrast to McClelland, et al's (1991) findings, Davis and Connell (1985) found underachievers were significantly higher on internality, while achievers were higher on perceptions of control by powerful others. However, there were no differences in locus of control between average and gifted groups. In their study there were four groups: gifted underachievers, gifted achievers, average underachievers and average achievers, ranging from 8 to 12 years old. The results indicated that underachieving children whether gifted or average in ability believed more strongly than achieving groups that internal attributes (efforts), not teacher attributes, were the causes of achievement outcomes.

These results contradict a typically held assumption about the positive relationship between internal locus of control and high academic ability on academic achievement. These inconsistencies may be the result of different instruments used. In

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Davis and Connell's study, the Multidimensional Measure of Children's Perceptions of Control (Connell, 1985) with 'internal', 'powerful others' and 'unknown control' three-dimensional scales were administered (Davis & Connell, 1985). On the other hand, two-dimensional scales were employed in the other studies, such as Intellectual Achievement Responsibility Questionnaire (Crandall, Katkovsky & Crandall, 1965) and Nowicki-Strickland (1973) I/E scale for Children. Additionally, the inconsistencies may be due to unbalanced sample sizes between achievers and underachievers in Davis and Connell's study, that is, 31 underachievers (15 gifted and 16 average ability students) versus 94 achievers (36 gifted and 58 average ability students).

### **THE INTERACTION BETWEEN LOCUS OF CONTROL AND REWARD CONTINGENCY ON ACADEMIC ACHIEVEMENT**

As noted previously, the major implication from the hypothesis proposed by Rotter (1966) is that internals tend to work more effectively and efficiently under performance-contingent reward. In the past three decades the discussion of locus of control construct in relation to reward contingency has appeared repeatedly in the literature, however the findings are contradictory.

Kennelly and Mount (1985) in their study found that subjects' internality and their perceptions that teachers administer contingent rewards were associated with higher academic achievement. In addition, Charlton and Terrell (1987) found that teacher's behavioural reward contingencies, such as comments that "You must have worked hard", and "That is good" could promote subjects' internal locus of control and lead to improvements in students' reading.

Furthermore, Trusty and Macan (1995) has found that under contingent reward condition, subjects with an internal locus of control desired more control over the procedures and types of tasks and performed better than did subjects with an external locus of control, whereas subjects with an external locus of control desired more control over the type of tasks and performed better than did those with an internal locus of control under non-contingent reward condition.

However, in investigating the effect of non-contingent reward on learned helplessness in children on a subsequent cognitive problem-solving task, Kramer and Rosellini (1984) found that externals exposed to non-contingency performed better than internals, but there was no significant difference between the performance of

internals and externals exposed to performance-contingent reward. These findings suggest that there is an interaction of differential locus of control with reward contingency. However, the patterns of interaction seem to partially contradict Rotter's hypothesis. According to Rotter (1966), internals tend to place a greater value on achievement reward. Logic would suggest that internals may tend to perform better than externals under performance-contingent reward condition.

Additionally, Kren (1992) examined the moderating effects of locus of control on performance-contingent incentives in forty-four undergraduate business students. In this study individual performance was measured in two ways: outcome and effort on the task. The results indicated that internals and externals did not differ in performance under performance-contingent reward but internals made more efforts on the task than externals. These findings of the lack of interaction between locus of control and reward on performance are consistent with those by Earn (1982).

Earn (1982) examined the actual performance on puzzle-solving in 392 university students under three levels of task-non-contingent rewards (Study 1) as a function of differential locus of control. The findings indicated that internals and externals did not in fact differ in their performance in solving the puzzles under task-non-contingent rewards, although internals rated themselves as being significantly more skilful at the task than did externals. In Study 2, three levels of pay were contingent upon actual performance in 412 university students. The results showed that the findings on rating of skill and performance on puzzles solving tended to parallel those found in Study 1. These outcomes suggested that there was no difference between internal and external students in puzzle-solving performance under either contingent or non-contingent reward.

In summary, research revealed there may be an interaction between differential locus of control and the efficacy of contingent and non-contingent rewards but the outcomes are not altogether consistent. Further investigation on moderating factors is required.

### **THE INTERACTION BETWEEN ACADEMIC ABILITY AND REWARD CONTINGENCY ON ACADEMIC PERFORMANCE**

Previous research has indicated a relationship between academic ability and reward contingency on students' performance. For example, Moran and Liou (1982) investigated the relationship between reward (Reward versus No Reward), Task

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(Picture completion task versus Circles task) and Ability (High ability versus Low ability) and suggested that reward led to a decrement in performance on the Circles task for High ability students but facilitated the performance of low-ability students. In addition, higher IQ students tended to perform better under contingent reward, while lower IQ students showed no tendency to perform worse following exposure to uncontrollable outcomes (Winefield, Barnett & Tiggemann, 1984). Similarly, Goldstein (1999) revealed an interaction between academic ability; psychopathy and reward-punishment contingency (earned or lost money based on performance). The results showed that high-IQ psychopaths were significantly more deficient in problem-solving in the non-contingent condition, whereas low-IQ psychopaths were significantly more deficient in the contingency condition.

Overall, the review of literature suggests that relatively few recent published studies have investigated the three-way interaction between locus of control, academic ability and reward contingency on academic achievement. Based on the literature reviewed to this point, locus of control and academic ability appears to play a mediating role for children's performance under different reward conditions. However the pattern of mediation is still not clear. A related area in need of further work is the examination of interaction between academic ability, locus of control and reward contingency on students' performance.

## **DISCUSSION AND IMPLICATIONS FOR RESEARCH**

### **Discussion**

In summary, empirical studies have demonstrated that rewards should be applied to learning and behaviour change in a careful manner; otherwise they may produce a negative effect. The literature indicates that performance-contingent rewards generally seem effective in facilitating learning, while non-contingent rewards tend to induce learned helplessness. However, research also provides support for the belief that the effect of reward contingency may be influenced by the variation in the individual's characteristics and socio-cognitive processes.

Although many cognitive theorists argue that extrinsic rewards may undermine intrinsic motivation, the effect of reward on intrinsic motivation remains debatable. Firstly, as Carton and Nowicki (1998) point out, the verbal stimuli (informing participants that there was no reward availability) could be the explanation for the undermining effect, rather than extrinsic reward itself. Secondly, extrinsic reward may serve to undermine or enhance students' intrinsic motivation depending on

whether the feedback is controlling or informational (Deci & Ryan, 1985); whether the reward procedure requires trivial performance or high performance; or whether the rewards are given for meeting un-specified performance standards or specified performance standards (Eisenberger, Pierce & Cameron, 1999). Thirdly, it seems problematic to conclude that the overjustification effect produces a permanent response deficit based on post-treatment 'free time' which spanned only several minutes. Fourthly, even if the findings are valid, that is, that when initial interest in a task is high, the introduction of rewards which are task-contingent, expected, and tangible will result in a decrease in interest, we may argue that school educators do not need to abandon rewards completely. In real life, not all school activities will be intrinsically interesting to all children. The possibility that extrinsic rewards set the conditions where intrinsic motivation may develop must also be acknowledged; as well as the possibility that after the rewards are withdrawn, intrinsic motivators may maintain the behaviour (Flora & Flora, 1999).

Based on Ryan and Deci's recent clarification of Cognitive Evaluation Theory (Ryan & Deci, 2000), the simple statement that "Extrinsic rewards may undermine intrinsic motivation" seemed questionable. Also, obstinate opposition toward extrinsic rewards appeared problematic. A more fruitful pursuit may be the investigation of the relationship between different types of rewards and the suggested mediating factors, such as locus of control and individual characteristics on actual performance. It is of the essence to understand how and what "motivates" people during the time they are in reality "performing". When students are motivated effectively by extrinsic reward, the process of self-regulation may be further developed.

Research findings show that locus of control may play a moderator role on the level of academic achievement. There is evidence that internality and academic achievement are positively related (Boatwright, 2002). However, this correlation appears to be stronger among adolescents than among children or adults (Kalechstein & Nowicki, 1997).

In addition, individuals with higher IQ may be more likely to have internal locus of control (McLaughlin & Saccuzzo, 1997). Gifted achievers are more likely to have an internal locus of control than gifted underachievers (Knight, 1995). On the other hand, underachieving gifted and non-gifted students tended to have more external locus of control than achieving gifted peers (Laffoon, et al., 1989). Apart from that, internality may compensate to some degree for a lack of academic ability in terms of academic achievement (Creek, et al., 1991).

## **The Relationship between Academic Ability, Locus of Control and Reward Contingency**

With respect to the relationship between locus of control and reward contingency, Rotter (1966) proposed that individuals with an internal locus of control may be more likely to place a greater value on achievement rewards than those with an external locus of control. The implication from Rotter's hypothesis suggests that internals tend to work more effectively and efficiently under performance-contingent reward than externals. The reason for this is that internals perceive a stronger relationship between personal effort and performance-related rewards. Therefore internals tend to work significantly harder than externals on the performance-contingent reward tasks. On the other hand, externals tend not to see the association between rewards and performances. Under such circumstance, performance-contingent reward fails to match externals' individual expectations. As a result, the nature of externality undermines the effects of rewards on performance. In the light of Rotter's proposition, in the past decades research has revealed contradictory results of an interaction between differential locus of control and the efficacy of contingent and non-contingent rewards (Charlton & Terrell, 1987; Earn, 1982; Kennelly & Mount, 1985; Kramer & Rosellini, 1984; Trusty & Macan, 1995). Further investigation on moderating factors is required.

In terms of interaction between academic ability and reward contingency, Winefield, Barnett and Tiggemann (1984) revealed a positive relationship between high academic ability and contingent reward. Similarly, Goldstein (1999) suggested that High-IQ psychopaths may be more deficient in problem-solving in the non-contingent condition, whereas low-IQ psychopaths may be more deficient in the contingent condition.

Taken together, we may argue that there may be moderating effects of locus of control on contingent reward and the level of academic ability in students. Based on the literature reviewed to this point, it is logical to argue that contingent reward could be either effective or non-effective in academic achievement depending in part on an individual's locus of control and his or her level of academic ability. Therefore, an individual's characteristics should be taken into consideration carefully when the types of rewards are employed in educational settings.

### **Implications for Research**

Although a body of recent research has investigated systematically the effect of different kinds of reward on intrinsic motivation, relatively few studies have focused on academic performance itself. Apart from that, there is also little research

examining the interaction between locus of control and the level of academic ability on academic achievement when operant conditioning learning is involved. Further experiments are needed to investigate how the effectiveness of different types of rewards is moderated by an individual's locus of control, especially when the level of academic ability is considered.

The further research is suggested to be hypothesized that:

1. There would be an interaction of different levels of academic ability and differential locus of control with *students' preferences* of contingent Performance Rewards and non-contingent rewards.
2. There would be an interaction of different levels of academic ability and differential locus of control with *students' performance* under contingent Performance Reward and non-contingent Chance Reward conditions.

If the experiments support the hypothesis, it would suggest that an individual's characteristics should be taken into consideration carefully when determining the most appropriate type of reward is employed in educational settings.

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## 學習能力、內外控信念與獎勵條件之間的相互關係

巫素真\*

### 摘要

從二十世紀初到一九六零年代中期以來，獎勵一直被行為理論學派視為學習過程中一項要素。近代有一些研究學者持不同見解，認為獎勵可能導致“習得無助感”，或產生“過度辯證效應”；也有些學者認為，當個人受到獎勵的誘惑時，反而會表現更差。本文作者認為，學生在面臨獎勵條件的學習情況下，是否表現較好或更糟，應視其個人特質與獎勵的方式而定。本文獻探討之目的在於提供此理論邏輯，作為未來以實驗方法檢視學習能力，內外控信念與獎勵條件之間的相互影響之根據。

關鍵字：學習能力、內外控信念、獎勵

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